Not quite *entrainment*:

Two decades ago it was assumed that the mechanism behind the consciousness-altering effects of Hemi-Sync was some how related to something called the frequency-following response. I wrote and spoke of this myself many times. Hypothetically, prolonged exposure to binaural-beat stimuli influenced brainwaves to the point of altering ongoing EEG through entrainment of the frequency-following response – a theorized process of imposed patterning on the nonlinear, stochastic resonance of ongoing brainwaves by means of the frequency beating of the auditory stimulus. Since an auditory frequency-following response could be measured at the cortex it seemed logical to assume that the underlying mechanism must be some form of Newtonian entrainment process at work. Entrainment was, and still is, the explanation behind the effects of intermittent photic stimulation (IPS) when used by medical personnel as a diagnostic tool for epilepsy.

The frequency-following response to binaural beats remains an important aspect in the understanding of the Hemi-Sync process. There is, however, no effect-mechanism to support the notion that entrainment of the frequency-following response is responsible for alterations in consciousness. We know now that the EEG signal strength of the measured auditory frequency-following response is extremely low. At this point it is hard to even speculate that it could in some electromagnetic inductive way alter ongoing brainwave activity. On the other hand, demonstrating the mere presence of a frequency-following response to the binaural beats of the Hemi-Sync process using *evoked-potential* EEG protocols[1] provides some evidence of the neurological impact of this stimulus. I recently completed a pilot study that objectively demonstrates frequency-following responses to binaural beats in brainwave frequency ranges associated with discrete altered states of consciousness – a finding intuitively rationalized for some time.

So, you may be asking at this point, how does Hemi-Sync work? To answer this question it is necessary to step back from the limited concepts of binaural-beat *entrainment*. Setting aside this pretentious notion, a review of the appropriate literature reveals that brainwaves and related states of consciousness are in fact regulated by the brain's reticular formation

[1] Evoked-potential studies use time-domain averaging of a number of EEG responses to mathematically isolate and identify stimuli that would otherwise be overwhelmed by ongoing brain-wave activity.

stimulating the thalamus and cortex. The reticular activating system (RAS) interprets and reacts to information (internal stimuli, feelings, attitudes, and beliefs as well as external sensory stimuli) by regulating arousal states, attentional focus, and the level of awareness – the elements of consciousness itself. The RAS maintains homeostasis unless there is informational stimuli (internal or external) requiring an adjustment to consciousness. In order to alter consciousness it is necessary to provide some sort of informational input to the RAS. Hemi-Sync appears to influence consciousness by providing this information. The information encompasses the character, quality, and traits of the state of consciousness that the complex Hemi-Sync pattern represents.

The expression "frequency-following response" as used by TMI is quite different than the same expression when used by the Audiology community and expressly in the following references among others:

Oster 1973; Smith et al. 1975; Marsh et al. 1975; Smith et al. 1978; Hink et al. 1980

These citations do not directly address the term "frequency-following response" as used by TMI and the idea that Hemi-Sync encourages such. TMI means to say with their use of the expression that Hemi-Sync encourages changes (towards frequencies similar to the stimuli) in overall brainwave (arousal) states. TMI's broader use of the expression does not refer to the low-amplitude shadow effect known to the Audiology community as the *frequency-following response*.